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October 23, 2003

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APPLICATION NUMBER: 60/435,626

FILING DATE: December 19, 2002

RELATED PCT APPLICATION NUMBER: PCT/US03/25421



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**PROVISIONAL APPLICATION FOR PATENT COVER SHEET**

This is a request for filing a **PROVISIONAL APPLICATION FOR PATENT** under 37 CFR 1.53 (c).

**Express Mail Label No. EV151113534US**

| INVENTOR(S)  |   |  |                |  |                |
|--|---|--|----------------|--|----------------|
| Given Name (first and middle [if any])<br><br>Pierre Adam M.   | Family Name or Surname<br><br>Bonnat Howard | Residence<br>(City and either State or Foreign Country)<br><br>Grieges, France,<br>Las Vegas, Nevada   |                |  |                |
| <input type="checkbox"/> Additional Inventors are being named on the ___ separately numbered sheets attached hereto  |   |  |                |  |                |
| <b>TITLE OF THE INVENTION (280 characters max)</b><br><b>Method And Apparatus To Interact With A Machine Utilizing Gestures</b>                                    |   |  |                |  |                |
| Direct all correspondence to: <b>CORRESPONDENCE ADDRESS</b>  |   |  |                |  |                |
| <input checked="" type="checkbox"/> Customer Number <div style="border: 1px solid black; width: 150px; height: 30px; display: inline-block; margin: 5px;"></div> → |   | <div style="border: 1px solid black; width: 150px; height: 80px; display: flex; align-items: center; justify-content: center;"> <div style="margin-left: 10px;">*08791*</div> </div> |                |  |                |
| OR<br><input checked="" type="checkbox"/> Firm or Individual Name  |   | Sanjeet K. Dutta<br>Blakely, Sokoloff, Taylor & Zafman LLP   |                |  |                |
| Address  |   | 12400 Wilshire Boulevard, Seventh Floor  |                |  |                |
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| Country  | USA   | Telephone  | (408) 947-8200 | Fax  | (408) 947-8280 |
| <b>ENCLOSED APPLICATION PARTS (check all that apply)</b>   |   |  |                |  |                |
| <input checked="" type="checkbox"/> Specification Number of Pages <div style="border: 1px solid black; width: 50px; text-align: center; margin: 5px;">12</div>     |   | <input type="checkbox"/> CD(s), Number <div style="border: 1px solid black; width: 100px; height: 20px; display: inline-block; margin: 5px;"></div>                                  |                |  |                |
| <input checked="" type="checkbox"/> Drawing(s) Number of Sheets <div style="border: 1px solid black; width: 50px; text-align: center; margin: 5px;">2</div>        |   | <input checked="" type="checkbox"/> Other (specify) <div style="border: 1px solid black; width: 150px; height: 30px; display: inline-block; margin: 5px;">Postcard</div>             |                |  |                |
| <input type="checkbox"/> Application Data Sheet. See 37 CFR 1.76   |   |  |                |  |                |
| <b>METHOD OF PAYMENT OF FILING FEES FOR THIS PROVISIONAL APPLICATION FOR PATENT (check one)</b>  |   |  |                |  |                |
| <input type="checkbox"/> Applicant claims small entity status. See 37 CFR 1.27.  |   |  |                | <b>FILING FEE<br/>AMOUNT (\$)</b>  |                |
| <input checked="" type="checkbox"/> A check or money order is enclosed to cover the filing fees  |   |  |                | <div style="border: 1px solid black; width: 100px; text-align: center; margin: 5px;">02-2666</div> <div style="border: 1px solid black; width: 100px; text-align: center; margin: 5px;">\$160.00</div> |                |
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| The invention was made by an agency of the United States Government or under a contract with an agency of the United States Government.                            |   |  |                |  |                |
| <input checked="" type="checkbox"/> No   |   |  |                |  |                |
| <input type="checkbox"/> Yes, the name of the U.S. Government agency and the Government contract number are:   |   |  |                |  |                |

*Respectfully submitted,*

SIGNATURE Sanjeet Dutta  
TYPED or PRINTED NAME Sanjeet K. Dutta

**TELEPHONE (408) 947-8200**

Date 12/19/2002

REGISTRATION NO. 46,145  
(if appropriate)

Docket Number: 5769P007Z

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This collection of information is required by 37 CFR 1.51. The information is used by the public to file (and by the PTO to process) a provisional application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 8 hours to complete, including gathering, preparing, and submitting the complete provisional application to the PTO. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form and/or suggestions for reducing this burden should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Box Provisional Application, Assistant Commissioner for Patents, Washington, DC 20231

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**FEE TRANSMITTAL  
for FY 2003**

Patent fees are subject to annual revision.

☐ Applicant claims small entity status. See 37 CFR 1.27.**TOTAL AMOUNT OF PAYMENT** (\$) **160.00****Complete if Known**

|                      |               |
|----------------------|---------------|
| Application Number   |               |
| Filing Date          |               |
| First Named Inventor | Pierre Bonnat |
| Examiner Name        |               |
| Group/Art Unit       |               |
| Attorney Docket No.  | 5769P007Z     |

**METHOD OF PAYMENT (check one)**
☒ Check ☐ Credit card ☐ Money Order ☐ Other ☐ None  
☐ Deposit Account
Deposit Account Number **02-2666**Deposit Account Name **Blakely, Sokoloff, Taylor & Zafman LLP**

The Commissioner is authorized to: (check all that apply)

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**FEE CALCULATION****1. BASIC FILING FEE**

| Large Entity        |          | Small Entity |          | Fee Description        | Fee Paid                  |
|---------------------|----------|--------------|----------|------------------------|---------------------------|
| Fee Code            | Fee (\$) | Fee Code     | Fee (\$) |                        |                           |
| 1001                | 740      | 2001         | 370      | Utility filing fee     |                           |
| 1002                | 330      | 2002         | 165      | Design filing fee      |                           |
| 1003                | 510      | 2003         | 255      | Plant filing fee       |                           |
| 1004                | 740      | 2004         | 370      | Reissue filing fee     |                           |
| 1005                | 160      | 2005         | 80       | Provisional filing fee | 160.00                    |
| <b>SUBTOTAL (1)</b> |          |              |          |                        | <b>(\$)</b> <b>160.00</b> |

**2. EXTRA CLAIM FEES**

Total Claims  20\* =  X  =   
 Independent Claims  3\* =  X  =   
 Multiple Dependent  =

| Large Entity        |          | Small Entity |          | Fee Description   | Fee Paid    |
|---------------------|----------|--------------|----------|---|-------------|
| Fee Code            | Fee (\$) | Fee Code     | Fee (\$) |   |             |
| 1202                | 18       | 2202         | 9        | Claims in excess of 20                                    |             |
| 1201                | 84       | 2201         | 42       | Independent claims in excess of 3                         |             |
| 1203                | 280      | 2203         | 140      | Multiple Dependent claim, if not paid                     |             |
| 1204                | 84       | 2204         | 42       | **Reissue independent claims over original patent         |             |
| 1205                | 18       | 2205         | 9        | **Reissue claims in excess of 20 and over original patent |             |
| <b>SUBTOTAL (2)</b> |          |              |          |   | <b>(\$)</b> |

\*\*or number previously paid, if greater. For Reissues, see below

**FEE CALCULATION (continued)****3. ADDITIONAL FEES**

| Large Entity |          | Small Entity |          | Fee Description  | Fee Paid |
|--------------|----------|--------------|----------|--|----------|
| Fee Code     | Fee (\$) | Fee Code     | Fee (\$) |  |          |
| 1051         | 130      | 2051         | 65       | Surcharge - late filing fee or oath  |          |
| 1052         | 50       | 2052         | 25       | Surcharge - late provisional filing fee or cover sheet                     |          |
| 2053         | 130      | 2053         | 130      | Non-English specification  |          |
| 1812         | 2,520    | 1812         | 2,520    | For filing a request for <i>ex parte</i> reexamination                     |          |
| 1804         | 920*     | 1804         | 920*     | Requesting publication of SIR prior to Examiner action                     |          |
| 1805         | 1,840*   | 1805         | 1,840*   | Requesting publication of SIR after Examiner action                        |          |
| 1251         | 110      | 2251         | 55       | Extension for reply within first month                                     |          |
| 1252         | 400      | 2252         | 200      | Extension for reply within second month                                    |          |
| 1253         | 920      | 2253         | 460      | Extension for reply within third month                                     |          |
| 1254         | 1,440    | 2254         | 720      | Extension for reply within fourth month                                    |          |
| 1255         | 1,950    | 2255         | 980      | Extension for reply within fifth month                                     |          |
| 1404         | 320      | 2401         | 160      | Notice of Appeal   |          |
| 1402         | 320      | 2402         | 160      | Filing a brief in support of an appeal                                     |          |
| 1403         | 280      | 2403         | 140      | Request for oral hearing   |          |
| 1451         | 1,510    | 2451         | 1,510    | Petition to institute a public use proceeding                              |          |
| 1452         | 110      | 2452         | 55       | Petition to revive - unavoidable   |          |
| 1453         | 1,280    | 2453         | 640      | Petition to revive - unintentional   |          |
| 1501         | 1,280    | 2501         | 640      | Utility issue fee (or reissue)   |          |
| 1502         | 460      | 2502         | 230      | Design issue fee   |          |
| 1503         | 620      | 2503         | 310      | Plant issue fee  |          |
| 1460         | 130      | 2460         | 130      | Petitions to the Commissioner  |          |
| 1807         | 50       | 1807         | 50       | Processing fee under 37 CFR 1.17(q)  |          |
| 1808         | 180      | 1808         | 180      | Submission of Information Disclosure Stmt                                  |          |
| 8021         | 40       | 8021         | 40       | Recording each patent assignment per property (times number of properties) |          |
| 1809         | 740      | 1809         | 370      | Filing a submission after final rejection (37 CFR § 1.129(a))              |          |
| 1810         | 740      | 2810         | 370      | For each additional invention to be examined (37 CFR § 1.129(b))           |          |
| 1801         | 740      | 2801         | 370      | Request for Continued Examination (RCE)                                    |          |
| 1802         | 900      | 1802         | 900      | Request for expedited examination of a design application                  |          |

Other fee (specify) \_\_\_\_\_

\* Reduced by Basic Filing Fee Paid

**SUBTOTAL (3)****(\$)****SUBMITTED BY**Name (Print/Type) **Sanjeet K. Dutta**

Registration No. (Attorney/Agent)

**46,145**

Telephone

**(408) 947-8200**

Signature

*Sanjeet Dutta*

Date

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UNITED STATES PROVISIONAL PATENT APPLICATION

FOR

**METHOD AND APPARATUS TO INTERACT WITH A MACHINE  
UTILIZING GESTURES**

INVENTOR:

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Attorney's Docket No. 5769P007Z

"Express Mail" mailing label number: EV151113534US

Date of Deposit: December 19, 2002

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## **METHOD AND APPARATUS TO INTERACT WITH A MACHINE UTILIZING GESTURES**

The present application incorporates by reference the disclosures in the following co-pending applications:

1. U.S. patent application serial no. 09/913,398, entitled "METHOD AND DEVICE FOR MONITORING AN ELECTRONIC OR COMPUTER SYSTEM BY MEANS OF A FLUID FLOW", filed August 10, 2001.
2. U.S. provisional application serial no. 60/368,602, entitled "A METHOD AND APPARATUS FOR POINTING AND CLICKING FUNCTIONS FOR CURSOR TRACKING IN GUI ENVIRONMENT", filed March 29, 2002.
3. U.S. provisional application serial no. 60/378,561, entitled "METHOD AND DEVICE FOR PROVIDING INPUT INTERFACE FOR THE AVIONICS AND AEROSPACE APPLICATION", filed May 6, 2002.
4. U.S. provisional application serial no. 60/378,573, entitled "METHOD AND APPARATUS FOR MONITORING AN ELECTRONIC OR COMPUTER SYSTEM BY MEANS OF A FLUID FLOW UTILIZING OPTO-ELECTRONIC CONVERSION DEVICES", filed May 6, 2002.
5. U.S. provisional application serial no. 60/402,994, entitled "METHOD AND APPARATUS FOR IMPLEMENTING USER INTERFACE CONTROL, AND NATURAL LIGHT SOURCE USAGE FOR SUCH CONTROL", filed August 12, 2002.

6. U.S. provisional application serial no 60/417,539, entitled "METHOD AND APPARATUS TO INTERACT WITH A MACHINE UTILIZING A FLUID," filed October 9, 2002.

### **DETAILED DESCRIPTION**

A method and apparatus to interact with a machine utilizing gestures are described. In the following description, for purposes of explanation, numerous specific details are set forth in order to provide a thorough understanding of the present invention. It will be evident, however, to one skilled in the art that the present invention may be practiced without these specific details.

The present application describes an exemplary embodiment for input interfaces.

This exemplary embodiment may be deployed in advanced mobile telephony, mobile computing, assistive inputting environments. It proposes that a user is enabled to run all the functionalities typically found on a mouse (or other UI navigation system) by various user interaction including breathing (e.g., air flow) and gestures utilizing ambient light with no need for complex commands or to "change the tool", such as, on a mouse, moving a finger from the button to the wheel in order to get a satisfactory scrolling, for example through web pages or long documents. Continuity and ease of interaction may thus be improved.

In an exemplary embodiment, transitions between motion and scrolling, or differentiation between pointing and clicking may be smooth, progressive, in the same breath, or in a continuous gesture.

According to an exemplary embodiment, an interface device is optimized by utilizing ambient light.

## **AMBIENT LIGHT**

A substantial energy saving is achieved by reducing the powering of artificial sources of light such as LEDs or lasers by using ambient daylight to complement or replace artificial sources.

The present embodiment applies to any kind of ambient light, including any sort of fluorescent and/or incandescent lights, thanks to suited light detectors and specific windows opened in the casing of the device, close to detectors (3.a & b.). Thus, the present embodiment allows to avoid or at least reduce the piping of ambient light to detectors.

The present embodiment allows the four light detectors (clockwise: left, down, up, right motion) to be illuminated at their rest position, the stress breath coming to decrease the amount of light to be received by the detector, possibly up to darkness.

An artificial source of light is embedded in the device (preferably LED), so to complement the ambient light for usage by night or in insufficient light, thanks to an averaging of the amount of light detected (cycling of detectors), to be processed by microcontroller. This artificial light can be piped (fiber optics...) or reflected to the detectors (3. a.).

Detectors are angled (3. c.), in order to get the best ambient illumination in either ways of interfacing (air or gesture, see below), regardless of the position of the device, supposedly close to the user's chin or put on a surface.

## **INTERFACING USING GESTURES**

The use of ambient light makes it possible, with a single device, to interface either by means of air flow (i.e., the user breathing) or gesture.

Indeed, the user can run all the functionalities of a mouse by breathing. In line with this, and notably given the current enhanced recourse to ambient light, the user can input computers (GUI) and electronic appliances by means of gesture as well. For example, the device, generally part of a headset, head-mounted device, or any other wearable apparatus enabling the user to breathe into it, can be put down on a desk or any surface (possibly after being removed from its usual support, see 3. g. & 4., example of a headset), worn on a belt, or inserted in existing workstations, so to be used as a gesture-based input interface (5.). This should be noted that the device is preferably wireless (eg., Bluetooth).

That way, movements of the hand will interfere (shade, see 3. f.) with the ambient illumination of the device (with no contact with the device itself), and consequently with the illumination of the embedded detectors, so to generate an analog sensing, to be processed as pointing functionalities (eg., the shade of the hand – or even a single finger – positioned directly above a detector, disrupts, possibly up to full darkness as the hand



gets closer to the device, the illumination of the “left” detector, thus generating a motion of a cursor towards the left, on a monitor... all combinations being possible so to get diagonals, while acceleration is provided through processing scalability of the electric signals that result from the sensing), whereas Boolean functions such as clicking will preferably result from fast movements (brief breaks in detectors’ illumination, eg., all detectors’ illumination disrupted within a short period of time is processed as a single click, left button of a mouse if the disruption starts on the left – left-hand detector -, all detectors’ illumination disrupted within a short period of time, first from left to right, then the opposite is processed as a double click, left button, while all detectors’ illumination disrupted within a short period of time is processed as a single click, right button of a mouse if the disruption starts on the right... A “double-click”, “right button” could thus be processed as a held click, etc.). The latter are just processing options, insofar as the sensing on its own allows to work out a variety of functionalities on the processing side, according to usage patterns.

In an alternate embodiment, buttons on the device can handle the clicking functionalities by pressing them. However, such design would provide a minimal-contact type of interaction, allowing a high level of protection in extreme environments (industrial workstations, for example, in which the device could be put down under an airtight, waterproof “bell jar”). Nevertheless, a button can be added on the casing of the device to switch between air and gesture-based interaction.

Different design options come to enhance the user experience, such as, on the ergonomics side, position the "up-sensor" window towards the top of the device (3. e. & d.), allowing an easier and more effective gesture recognition, or the way detectors are angled to optimize their illumination by the ambient light.

## SEGMENTS DESIGN

The present embodiment uses four segments in place of eight. These non-transparent (non conductive to light, full bandwidth) segments can be stressed in two directions, either by the user blowing out (expiring) or sucking in (inspiring), enabling a reduction of their number. The segments are, assembled together in the form of a flexible comb, possibly holding springs or other mechanical systems able to stabilize the segments' rest position (2. d.). Their free end travel is quite restricted (2. a.).

Channels are specifically designed to channel the air flow from inlet/ outlets opened on the top of the device up to those of the bottom by optimizing the stress breath on segments, however allowing a logical visual positioning of the top outlets (sections 1. a to 1. d.) and a manufacturing/ assembly process. The segments are positioned in relatively (no friction between segments and walls) airtight compartments (2. c.) that make the vacuum/ "sucking in" stress easier by minimizing the volume of air, and that make the stress breath/ "blowing out" action more variable, notably insofar as 100% of the air expired comes to stress the segment until it reaches a position that allows the air to escape by the inlet/ outlet opened on the bottom of the compartment and device.

The segments allow, at their rest position, the detectors to be illuminated by ambient light and possibly, when needed, by complementary (preferably piped) artificial sources (2.b.). The stress breath comes to make the segments move so that they will:

- user blowing out: progressively reduce the amount of light able to hit the detectors. This results in an analog sensing is able to generate pointing functionalities such as movement (cursor, pointer...), scrolling, zooming, according to processing.
- user sucking in: allow switch-type contacts, thanks to (at least part of) their surface being conductive and brushes, wires, or pins. A variety of designs can be implemented so to allow different sort of switches. This results in a digital sensing able to generate clicking functionalities and similar interactions (selection...). This combination of expiration and inspiration, within a short, fast sequence, can be used to generate "Boolean" functionalities such as (double) clicking.

The above described processing pattern is an exemplary embodiment, which can translate into various programs, including different modes of cycling, checking (IRQ...), pulsing the light sources and detectors, several thresholds, ranges, signal levels and incrementation, conditions, in order to comply with existing computing environments (e.g., ports, interfaces, drivers, GUI functionalities, applications) or new ones as well, such as "3D" (three dimensional) applications.

Lastly, it should be noted that the exemplary processing pattern can apply to a variety of sensors, in addition to those previously described, in order to enable a Human-Computer (or Human-to-electronic-appliance) interaction, more precisely an inputting.

The figures below also show a diagrammatic representation of machine in the exemplary form of a computer system within which a set of instructions, for causing a machine to perform any one or more of the methodologies discussed above may be executed. In alternative embodiments, the machine operates as a standalone device or may be connected (e.g., networked) to other machines. In a networked deployment, the machine may operate in the capacity of a server or a client machine in server-client network environment, or as a peer machine in a peer-to-peer (or distributed) network environment. The machine may be a personal computer (PC), a tablet PC, a set-top box (STB), a Personal Digital Assistant (PDA), a cellular telephone, a web appliance, a network router, switch or bridge, a user interface device capable of interacting with any of the above described devices, or any machine capable of executing a set of instructions (sequential or otherwise) that specify actions to be taken by that machine. Further, while only a single machine is illustrated, the term "machine" shall also be taken to include any collection of machines that individually or jointly execute a set (or multiple sets) of instructions to perform any one or more of the methodologies discussed herein.

The exemplary computer system includes a processor (e.g., a central processing unit (CPU) a graphics processing unit (GPU) or both), a main memory and a static memory, which communicate with each other via a bus. The computer system may further include a video display unit (e.g., a liquid crystal display (LCD) or a cathode ray tube (CRT)). The computer system also includes an alphanumeric input device 1912 (e.g., a keyboard), a user interface navigation device (e.g., the user interface device discussed above), a disk drive unit, a signal generation device (e.g., a speaker) and a

network interface device.

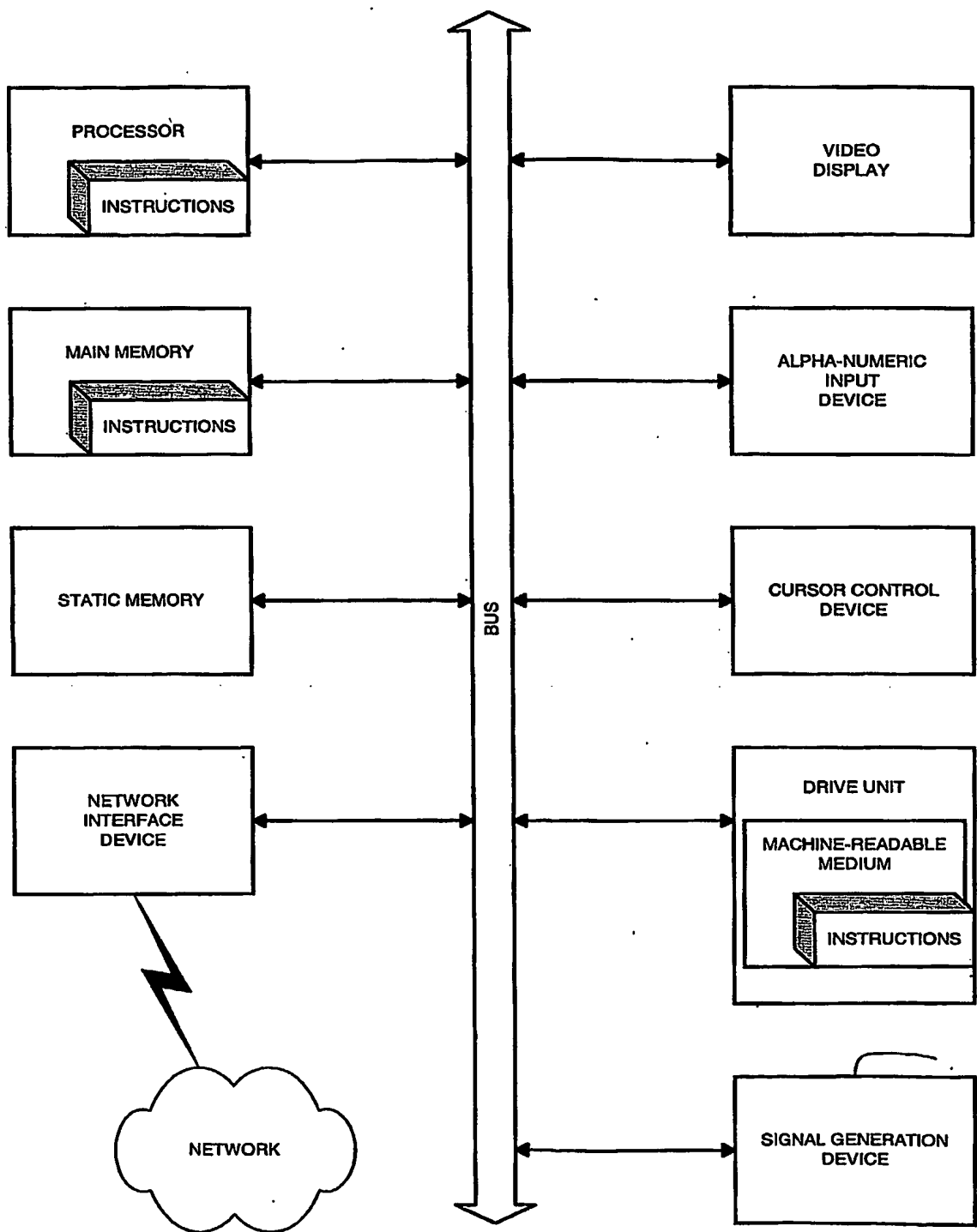
The disk drive unit includes a machine-readable medium on which is stored one or more sets of instructions (e.g., software) embodying any one or more of the methodologies or functions described herein. The software may also reside, completely or at least partially, within the main memory and/or within the processor during execution thereof by the computer system, the main memory and the processor also constituting machine-readable media.

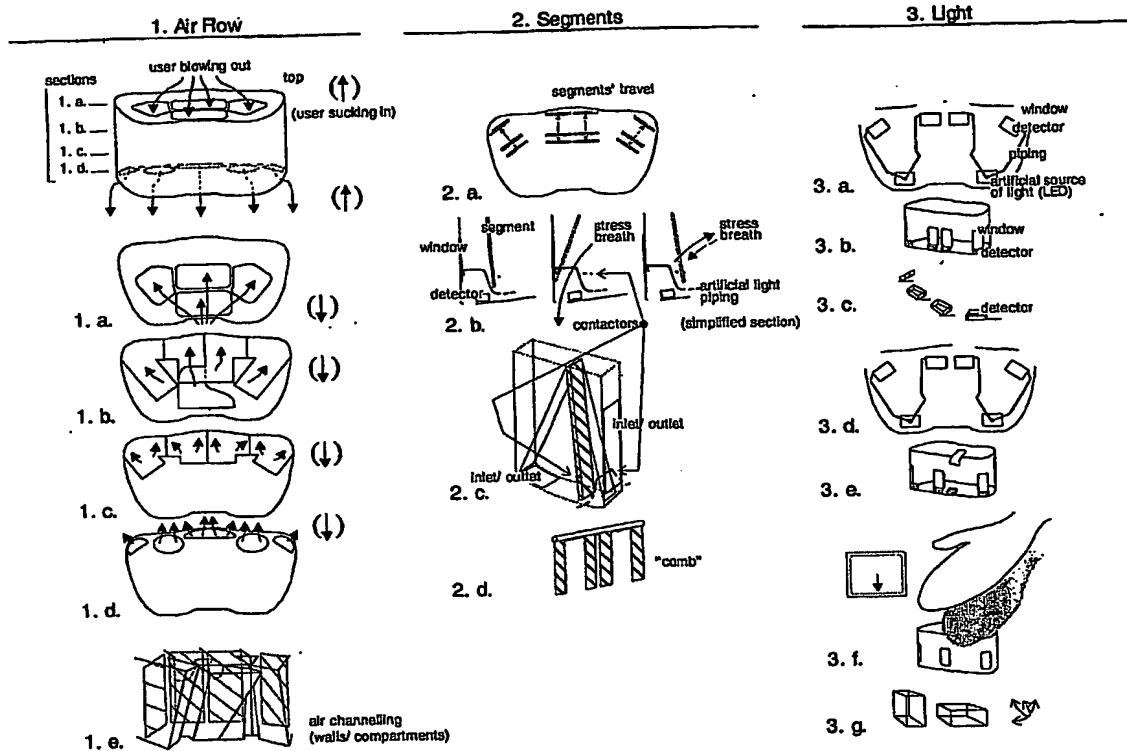
The software may further be transmitted or received over a network via the network interface device.

While the machine-readable medium is shown in an exemplary embodiment to be a single medium, the term "machine-readable medium" should be taken to include a single medium or multiple media (e.g., a centralized or distributed database, and/or associated caches and servers) that store the one or more sets of instructions. The term "machine-readable medium" shall also be taken to include any medium that is capable of storing, encoding or carrying a set of instructions for execution by the machine and that cause the machine to perform any one or more of the methodologies of the present invention. The term "machine-readable medium" shall accordingly be taken to include, but not be limited to, solid-state memories, optical and magnetic media, and carrier wave signals.

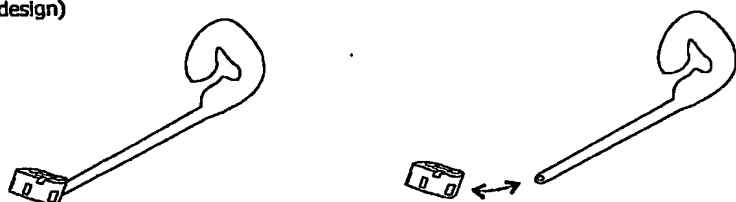
Thus, a method and apparatus to interact with a machine utilizing gestures have been described. Although the present invention has been described with reference to specific exemplary embodiments, it will be evident that various modifications and changes may be made to these embodiments without departing from the broader spirit







#### 4. Headset (possible design)



#### 5. Gesture-based Interaction

